

## **Claims**

What is claimed is:

1. A system for establishing a centerline in a rotary machine relative to a first and second reference surface, comprising:

a light source for emitting a columnar beam of light;

a support structure for fixedly supporting said light source relative to said rotary machine;

a first centering tool having a pass-through light receiver disposed at one end of said centering tool at a position such that the center of said receiver lies at the center of said first reference surface when an opposite end of said centering tool is positioned to abut said first reference surface;

a second centering tool having a light receiver disposed at one end of said centering tool at a position such that the center of said receiver lies at the center of said second reference surface when an opposite end of said centering tool is positioned to abut said second reference surface; and

an adjustment mechanism on said support structure for adjusting the position of said light source in at least a horizontal and vertical direction and for aligning said beam of light to impact the center of said light receivers in said first and second centering tool.

2. The system of claim 1 further including a tool-support structure comprising at least three bracing arms, a central portion having a pass-through light receiver, and a tool-support arm for fixedly supporting a tool.

3. The system of claim 2 wherein said bracing arms of said tool-support structure further comprise a transducer for indicating the position of said central portion.

4. The system of claim 1 further including a data-processing system and an automatic-adjustment mechanism for automatically adjusting said horizontal and vertical position of said light source until said beam of light passes through said light receivers of said first and second centering tool.

5. The system of claim 2 wherein said bracing arms are spring-loaded and comprise an extendable portion for altering the length of said bracing arms.

6. The system of claim 4 wherein said automatic-adjustment mechanism comprises a stepper motor in electronic communication with said data-processing system.

7. The system of claim 1 wherein said light source comprises a laser light emitter.

8. A system for establishing a centerline in a rotary machine relative to a first and second reference surface, comprising:

a light emitter means for emitting a columnar beam of light;

a support means for fixedly supporting said light emitter means relative to said rotary machine;

a first centering means having a pass-through light receiver disposed at one end of said centering means at a position such that the center of said receiver lies at the center of said first reference surface when an opposite end of said centering means is positioned to abut said first reference surface;

a second centering means having a light receiver disposed at one end of said centering means at a position such that the center of said receiver lies at the center of said second reference surface when an opposite end of said centering means is positioned to abut said second reference surface; and

an adjustment means on said support structure for adjusting the position of said light emitter means in at least a horizontal and vertical direction and for aligning said beam of light to impact the center of said light receivers in said first and second centering means.

9. The system of claim 8 further including a tool-support means comprising at least three bracing arms, a central portion having a pass-through light receiver, and a tool-support arm for fixedly supporting a tool.

10. The system of claim 9 wherein said bracing arms of said tool-support means further comprise a transducer for indicating the position of said central portion.

11. The system of claim 8 further including a data-processing system and an automatic-adjustment means for automatically adjusting said horizontal and vertical position of said light emitter means until said beam of light passes through the center of said light receiver in said first and second centering means.

12. The system of claim 9 wherein said bracing arms are spring-loaded and comprise an extendable portion for altering the length of said bracing arms.

13. The system of claim 11 wherein said automatic-adjustment means comprises a stepper motor in electronic communication with said data-processing system.

14. The system of claim 8 wherein said light emitter means comprises an eye-safe laser light emitter.

15. A method for determining a centerline in a rotary machine, comprising the steps of:

positioning a light source at a first end of said rotary machine near the center of a first curved reference surface;

positioning a first and second centering tool on said first and second curved reference surface, said first and second centering tool having a light receiver at a distal end of said centering tool at a position such that the center of said light receiver corresponds with the center of said curved reference surfaces;

emitting a beam of light from said light source toward said first and second centering tools;

adjusting the position of said light source so that said beam passes through said center of said light receivers in said first and second centering tool; and

fixing the position of said light source to indicate said centerline.

16. The method of claim 15 further comprising the steps of

positioning a tool-support structure, comprising a central portion having a pass-through light receiver and a tool-support arm for fixedly supporting a tool, in a position such that said beam passes through the center of said light receiver of said tool-support structure;

positioning said tool by adjusting the position of said tool-support arm; and

performing a tooling operation using said tool.